

CLAIMS

1. A display device provided with a plurality of light-emitting units stacked together between a cathode and an anode, each of said light-emitting units including at least an organic light-emitting layer, and also with a charge generation layer held between each two adjacent ones of said light-emitting units, wherein said charge generation layer is composed of an oxide comprising at least one of alkali metals and alkaline earth metals.

2. A display device according to claim 1, wherein said charge generation layer is composed of Li_2SiO_3 .

3. A display device according to claim 1, wherein said charge generation layer is formed of a mixed layer composed of Li_2SiO_3 and a charge transport material.

4. A display device according to claim 1, wherein said charge generation layer has a stacked structure of a layer composed of Li_2SiO_3 and a mixed layer composed of Li_2SiO_3 and a charge transport material.

5. A display device according to claim 1, wherein said oxide in said charge generation layer forms

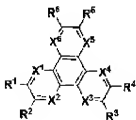
an interfacial layer on an anode side of said charge generation layer.

6. A display device according to claim 1, wherein said oxide in said charge generation layer, said oxide comprising said alkali metal, is at least one oxide selected from Li_2SiO_3 , Li_2CO_3 and Cs_2CO_3 .

7. A display device according to claim 1, wherein an interfacial layer on a cathode side of said charge generation layer is composed of an organic material having the phthalocyanine skeleton.

8. A display device according to claim 1, wherein said charge generation layer is insulative.

9. A display device according to claim 1, wherein said charge generation layer comprises an organic compound represented by the following formula (1):



..... Formula (1)

wherein R^1 to R^6 are each independently a substituent selected from a hydrogen atom, a halogen atom, a hydroxyl group, an amino group, an arylamino group, a

substituted or unsubstituted carbonyl group having not more than 20 carbon atoms, a substituted or unsubstituted carbonyl ester group having not more than 20 carbon atoms, a substituted or unsubstituted alkyl group having not more than 20 carbon atoms, a substituted or unsubstituted alkenyl group having not more than 20 carbon atoms, a substituted or unsubstituted alkoxyl group having not more than 20 carbon atoms, a substituted or unsubstituted aryl group having not more than 30 carbon atoms, a substituted or unsubstituted heterocyclic group having not more than 30 carbon atoms, a nitrile group, a nitro group, a cyano group, or a silyl group; each two adjacent ones of R^m (m : 1 to 6) may be fused together via a cyclic structure associated therewith; and X^1 to X^6 are each independently a carbon or nitrogen atom.

10. A display device according to claim 9, wherein said metal oxide in said charge generation layer forms an interfacial layer on an anode side of said charge generation layer, and said organic compound forms an intrinsic charge generation layer arranged in contact with said interfacial layer.

11. A display device provided with a plurality of light-emitting units stacked together between a

cathode and an anode, each of said light-emitting units including at least an organic light-emitting layer, and also with a charge generation layer held between each two adjacent ones of said light-emitting units, wherein at an interface on an anode side of each charge generation layer, an interfacial layer composed of a fluoride comprising at least one of alkali metals and alkaline earth metals is arranged.

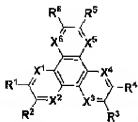
12. A display device according to claim 11, wherein said interfacial layer is formed of a conducting material layer and a layer arranged on an anode side of said conducting material layer and composed of a fluoride comprising at least one of alkali metals and alkaline earth metals.

13. A display device according to claim 12, wherein said conducting material layer comprises at least one of magnesium, silver and aluminum.

14. A display device according to claim 11, wherein an interfacial layer on a cathode side of said charge generation layer is composed of an organic material having the phthalocyanine skeleton.

15. A display device according to claim 11, wherein said charge generation layer in contact with said interfacial layer is insulative.

16. A display device according to claim 11,
 wherein said charge generation layer comprises an
 organic compound represented by the following formula
 (1):



.... Formula (1)

wherein R^1 to R^6 are each independently a substituent
 selected from a hydrogen atom, a halogen atom, a
 hydroxyl group, an amino group, an arylamino group, a
 substituted or unsubstituted carbonyl group having not
 more than 20 carbon atoms, a substituted or
 unsubstituted carbonyl ester group having not more than
 20 carbon atoms, a substituted or unsubstituted alkyl
 group having not more than 20 carbon atoms, a
 substituted or unsubstituted alkenyl group having not
 more than 20 carbon atoms, a substituted or
 unsubstituted alkoxy group having not more than 20
 carbon atoms, a substituted or unsubstituted aryl group
 having not more than 30 carbon atoms, a substituted or
 unsubstituted heterocyclic group having not more than 30
 carbon atoms, a nitrile group, a nitro group, a cyano

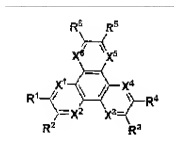
group, or a silyl group; each two adjacent ones of R^m (m: 1 to 6) may be fused together via a cyclic structure associated therewith; and X^1 to X^6 are each independently a carbon or nitrogen atom.

17. A display device according to claim 16, wherein said interfacial layer is formed of a layer, which is composed of a fluoride comprising at least one of alkali metals and alkaline earth metals, and a conducting material layer arranged in this order from the side of said anode; and said organic compound forms an intrinsic charge generation layer arranged in contact with said interfacial layer.

18. A display device provided with a plurality of light-emitting units stacked together between a cathode and an anode, each of said light-emitting units including at least an organic light-emitting layer, and also with a charge generation layer held between each two adjacent ones of said light-emitting units, wherein said charge generation layer is formed of a mixed layer of at least one element of alkali metals and alkaline earth metals and an organic material and an intrinsic charge generation layer stacked in contact with each other in this order from the side of said anode.

19. A display device according to claim 18,

wherein said charge generation layer comprises an organic compound represented by the following formula (1):



.... Formula (1)

wherein R^1 to R^6 are each independently a substituent selected from a hydrogen atom, a halogen atom, a hydroxyl group, an amino group, an arylamino group, a substituted or unsubstituted carbonyl group having not more than 20 carbon atoms, a substituted or unsubstituted carbonyl ester group having not more than 20 carbon atoms, a substituted or unsubstituted alkyl group having not more than 20 carbon atoms, a substituted or unsubstituted alkenyl group having not more than 20 carbon atoms, a substituted or unsubstituted alkoxy group having not more than 20 carbon atoms, a substituted or unsubstituted aryl group having not more than 30 carbon atoms, a substituted or unsubstituted heterocyclic group having not more than 30 carbon atoms, a nitrile group, a nitro group, a cyano group, or a silyl group; each two adjacent ones of R^m

(m: 1 to 6) may be fused together via a cyclic structure associated therewith; and X^1 to X^6 are each independently a carbon or nitrogen atom.

20. A display device according to claim 18, wherein said at least one of said alkali metals and alkaline earth metals in said mixed layer amounts to not more than 50% in terms of relative film thickness percentage.

21. A display device according to claim 18, wherein at said interface on the anode side of said charge generation layer, an interfacial layer composed of a fluoride comprising at least one of alkali metals and alkaline earth metals is arranged.

22. A display device according to claim 18, wherein an interfacial layer on a cathode side of said charge generation layer is composed of an organic material having the phthalocyanine skeleton.